MICROWAVE IMAGING AND 11OK)GRAPHIC DIAGNOSTIC TO ANTENNAS IN CYLINDRICAL NEAR-FIELD MEASUREMENT[1]

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A bstract

In this paper, the issues pertaining to microwave imaging and holographic diagnostic to antennas in cylindrical near-fic]d measurements arc addressed. The theoretical approach is based on expanding the work in [1] and [2] where a cylindrical wave expansion of the field on a cylindrical near-fic]d surface is given. The sampling probe is modeled by its equivalent aperture current (idealized circular aperture) and incorporated into the near-field to far-field transformation. The method of steepest decent is applied to obtain the far-field. In its implementation, however, onc could specify directly the angular spectrum at which the far-field is desired to bc calculated without resorting to interpolation, The microwave imaging and holographic diagnostic is based on back projection where a plane wave expansion of the far-field is obtained. '1 his approach necessitates the knowledge of the far-field at exact angular spectrum resulting from application of 2-DFFT. 1 lence, wc were able to construct simply the near-field on a plane not necessaril y on the aperture plane of the test ant enna but also on planes perpendicular to the aperture plane [3]. And a 3-1) high resolution and high precision antenna imaging of the test antenna is obtained from cylindrical near-field simulated measurements. In addition microwave holographic diagnostic of large NASA scatterometer molar antenna obtained from measured near-fic]d on a cylindrical surface will bc given if time permits.

[1] Z.A. 1 lussein, "1 fficient And Fast Reconstruction Of The Far-Field From Measured Near-Field On A Cylindrical Near-l~icld Surface" *JPL D-9124, November 8,* 1991.

[2] Z.A. 1 lussein and Y. Rahmat-Samii, "Probe Compensation Characterization in Cylindrical Near-l;icld Scanning" 1993 *IEEE Digest A P-S International Symposium, A nn A rbor, Michigan, June* 28, 1993.

[3] Z.A. 1 lussein "Microwave imaging And 1 holographic Diagnostic T 'o Antennas in Cylindrical Near-Field Measurement" *JPL Interoffice Memorandum 3361-94-108, June 8, 1994.*

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